Karen Lund
Senior lecturer, PhD (Danish as a second language).
Department of Pedagogical Anthropology, The Danish University of Education. karlund@dpu.dk

Age and accent

Is it possible to achieve an accent-free pronunciation no matter when one begins to learn a new language? For a chosen few, perhaps. researchers on the basis of their investigations as well as teachers via their experiences are otherwise very much of one mind: it is generally speaking only children who start to learn a new language early that acquire a pronunciation that does not immediately differ from a native-speaker's use of the language. It makes no difference how many years one comes to use the new language should one start to learn it too late. And too late is actually quite early on in life.

Already from around the age of 5-6, there can be pronunciation features in the new language that one never acquires. This applies both to such suprasegmental features as intonation, stress and rhythm and to segmental features such as the quality of vowels and consonants. According to a great deal of the research carried out within pronunciation, it is impossible after the age of 15-16 to achieve a near-native pronunciation in the new language, no matter how motivated one is and no matter how favourable one's access is to hearing and using the language. This applies to both foreign and second language acquisition as well as to the acquisition of the native language: so-called 'savage children' who have lived in linguistic isolation, and children who have grown up with deaf parents and no spoken language, do not gain the same linguistic competences in their native language either if they have not been exposed to spoken language when small - and this presumably applies from as early as around the age of four. It has also been shown that age has an effect on the development of deaf children's sign language.

Age-related influence is not restricted to phonology. Syntax and morphology are also affected, although not with any influence before around puberty. Research is less unanimous here, however, concerning the degree of influence and whether age plays as decisive a role as in the case of pronunciation.

A possibly sensitive period for the acquisition of pronunciation begins then around 5-6. The longer one learns, the better one becomes; and at the beginning of the learn-

ing process older children and adults are faster than younger children - presumably because of a larger cognitive capacity. But the advantage is short-lived: finally, the person who started as a 5-6 year-old overtakes the others. The earlier one embarks on one's language enterprise, the better one's pronunciation will be in the long term. Year six is, as Long puts it, *the beginning of a decline in phonological abilities* (Long 1990:226).

People are less agreed as to what extent 15-16 represents the last chance of attaining a target-language pronunciation, as claimed by some researchers. But it seems clear that only a tiny percentage of those who begin to learn a language as an adult achieve a pronunciation without an accent. If one looks at the total number of learners who begin to learn after puberty, the degree of variability is vast, ranging from the near-native to a pronunciation that differs considerably from the target language. And there are also large differences among children.

When one talks about the foreign and second language acquisition of young people and adults, there is thus no reason to strive to achieve the ultimate - i.e. a flawless, near-native pronunciation - for it is simply not within reach, no matter how long one goes on learning and no matter how favourable the circumstances are under which one learns.

This brings into focus the importance of having realistic aims that are followed up on a regular basis. It cannot be overemphasised how important it is from day one to work explicitly on pronunciation in language teaching. For precisely a wrong pronunciation and wrong stresses 'settle' quickly and can only be readjusted with great difficulty later on.

A sensitive age for pronunciation - why?

Why are small children better at achieving near-native pronunciation in a new language than young people and adults? There are various hypotheses - some more speculative than others. Let us look at a few of them.

Explained from a *socio-psychological point of view*, the identity of the adult is more firmly anchored than that of the child; therefore, the adult resists total socialisation, which includes the pronunciation patterns of the new language - seen in this hypothesis as an encroachment on the individual's identity. For some people it is important to retain an accent precisely as part of a second-language identity.

The child's mental boundaries are more flexible; therefore the child's pronunciation is more susceptible to influence than that of the adult, is a further argument. On the basis of such an explanation it is also possible to understand why some adults

achieve a much better pronunciation in the new language than others with the same native language: a greater capacity for empathy and therefore better preconditions for temporarily identifying oneself and placing one's own identity on stand-by. (Larsen-Freeman & Long 1991: 163, 190).

Naturally, one must question why phonology of all things is affected so early on by social, psychological and affective conditions while other language areas are not - until later in life, at any rate. There is still a need for much research within this field of interpretation and, when it comes to it, socio-psychological hypotheses are difficult to test. They can easily appear to be adroit rationalisations after the event.

Some researchers believe that children are exposed to *better input* than adults - a more here-and-now-anchored and therefore more easily understandable language that is less complex and more limited. In other words, a delimited comprehensible language field to practice within. Moreover, children have better opportunities to play with language along with people of the same age, which gives them a great deal of phonological training. A pedagogical implication of this is that one must give pupils/students more opportunities to play with and train the language and make sure that this occurs within a delimited section of the language.

Neurobiologically based hypotheses

The neurobiologically based hypotheses are probably the best-researched to date when it comes to quality. They are based on *neurophysiological relations* concerning the neural plasticity of the brain - a field into which we are gaining ever greater insight thanks to technological advances.

According to Lenneberg (1967), who was among the first to advance hypotheses concerning the importance of age for language acquisition, the diminishing ability for language acquisition is related to how the various parts of the brain cooperate and with the lateralisation of the brain - i.e. with the gradual organisation of work functions to the right and left hemisphere of the brain. And most of this organisation is completed precisely around the age of 5-6.

The diminishing plasticity of the brain is today explained more precisely and combined with other brain changes, e.g. the speed at which the electrical impulses move round the brain. Here such substances as myelin have an important function, since the amount of this substance affects the conductivity of the nerve fibres (axons). The myelinisation process in the brain, which begins already at the embryo stage, plays generally speaking a highly central role in the development of general human functions - including language development.

At as early an age as six months the child is able to distinguish adjacent sounds from each other; this means that a neural basis for the articulation of language sounds is formed at an early age. The nerve paths that are used to control the muscles used during the production of language sounds are encapsulated in myelin, which causes the nerve impulses to move faster. In that way, special high-speed nerve paths are formed to send signals to the muscles most often in use. Less important nerve paths where signals less often pass, do not get a layer of myelin and almost assume a kind of side-line function with low activity. In that way, a given functional pattern of articulatory movements is formed that causes certain pronunciation features to be promoted in some languages and to be absent in others. In Spanish, rounded front vowels such as /y/ are, for example, absent and therefore difficult to acquire in Danish; this is either compensated for by using the unrounded variant /i/ or the corresponding back vowel /u/. The movement patterns of the native language thus have a tendency to take over when acquiring the new language sounds.

It is now possible, via neurological experiments, to prove that as a general rule it would seem that the earlier a foreign or second language is learned, and the better it is spoken and understood, the more one can confirm that its representation in the brain overlaps that of the native language. The differences in representation among people regarding the foreign and second language are considerable - and far larger than in the representation of the native language. Examples have i.a. been seen of people where the native language was represented in the left-hand side of the brain while the foreign language was represented in the right-hand side (Gade 1998:.299). This could possibly indicate that the native language and the foreign or second language one masters well are activated from common areas in the brain.

The earlier, the better the neurophysiological conditions; the later, the less brain plasticity. The result: the earlier, the more near-native the pronunciation; the later, the greater variability among learners and the less change of a near-native pronunciation. There is much research to support this view. But it still remains to be proved that precisely puberty represents a demarcation line, as some research claims. Some results might seem to indicate that plasticity survives puberty and that learners up into their twenties still have the possibility to achieve near-native pronunciation. Neither, according to neurophysiological research, are there grounds for concluding that precisely puberty should be a particularly sensitive period.

Stable phonetic categories in the native language

Regarding the specially sensitive age of six, some researchers have, however, other explanations than the one that is based on the gradually diminishing plasticity of the brain. According to Flege (1992) and Bohn (e.g. Bohn & Flege: 1997), the lesser

degree of pronunciation success in young people and adults compared to children of 5-6 is due neither to changes in the perceptual and sensory-motor processes nor to a loss of neural plasticity. It is due to an importance shift in speech processing. At exactly the age of 5-6 the phonetic prototype categories and the boundaries between them are refined and stabilised, and there is a growing awareness in the child concerning segmental features in the language. Because the native language categories are established and stabilised, there is an increasing tendency for new sounds in the new language to be identified with the aid of the sound categories from one's native language; this helps to prevent older learners from establishing phonetic categories for sounds where there are great similarities between the two languages and thus also to prevent them from producing these sounds.

According to this hypothesis, one is able throughout one's life to establish new phonetic categories, but they have to be perceived by the learners as new and different enough, without too much overlap with sounds in the native language. If there is a great overlap, the learner - instead of establishing a completely new category - will classify the sound as the approximate sound in the native language. If, for example, one has aspirated /t/ in the native language and meets an unaspirated /t/ in the new language, one will categorise the new 't' as aspirated. When in, for example, Danish one meets the very dense /i-e-ɜ-æ-a-ɑ/ distribution and perhaps only uses three of the degrees of opening in one's native language, one will adapt the Danish degrees of opening to the sounds of one's native language and, over time, perhaps adjust the sound towards the Danish one but never quite hit it. For the child, on the other hand, every sound in the new language is a new sound, and the child does not attempt to assimilate sounds to the native language. Every sound has its own category for the child, while the mental map from the native language is the 'sounding board' for the acquisition of foreign language sounds for the adult.

Flege and Bohn's hypothesis has the advantage of both being able to take into account the sensitive age of around 5-6 as crucial for how close to the new language one gets and the fact that learners later on in life can achieve a high level of perfection in pronunciation when it comes to new sounds.

Even so, the hypothesis is unable to explain the fact that there can be that much variation among learners of the same age and with the same native language - this applies not only to adults but to children of the same age, too. Some researchers suggest that there may perhaps be differences in how finely tuned the hearing of the individual is, but once again we are within the realm of the speculative here, where motivational, psychological and personal factors may be possible explanations.

Some researchers claim that one can never achieve total native competence in two languages. Anne Cutler, via experimental psycholinguistic experiments, is able to show that one of the languages always dominates over the other in every person - even those that are thought to be totally bilingual. Using experiments with highly sensitive instruments she is able to demonstrate that in the meeting between languages with different prosodies - e.g. between English (or, for example, Danish), which uses stress patterns, and French, which has syllabic stress - one or the other of the types of stress will dominate in both languages.

By means of prosody we also express emotions and attitudes and, according to neurological investigations, we have a special functional area in the right hemisphere of the brain that deals with affective prosody. The fact that one constantly and unconsciously colours one's language with attitudes and emotions when one speaks, only perhaps becomes really apparent when one encounters people with brain damage that has affected precisely this functional area. Their speech is felt to be monotonous, toneless and disinterested.

That prosody plays such a central role for interaction is something that one as a foreign or second language speaker is only too well aware of; here the basis lies for a large number of intercultural misunderstandings - among other things because we are not aware of precisely how and for what purpose we use prosody. Nor are we aware of the fact that people from different language areas have different prosodic conventions. English speakers, for example, use intonation patterns in order to underline their message. Danes use stress for this purpose, which is decoded by English speakers as anger and aggression. When Danes transfer their prosodic code to English, there is thus fertile ground for unpleasant misunderstandings!

The role of the native language

Flege's hypothesis places the traditional native-language-based explanations in a new light. Firstly, though, I would like to stress the following:

1) As with other aspects of language acquisition, it must apply that the more overlap between the native language and the new language, the fewer learning assignments for the learner. What is identical simply does not have to be relearned.
2) As with all other aspects of language acquisition, it must also apply that the more differences there are between the native language and the new language, the more learning assignments there are, and the longer time one must expect the learning to last.

A Vietnamese thus has a greater learning assignment when it comes to Danish as a

new language than a German or a Dutchman, who can build on the many similarities between their native languages and Danish.

When beginning to acquire the new language, the learner generally tries to employ existing phonological categories from the native language - as we can also see within all other language areas. In the course of the ensuing learning process, an attempt is made to get the sounds to approach those of the new language; the greater experience with the language influences both the perception of the sounds and their production.

Unlike a traditional contrastive conception, where everything that is different is claimed to be what is difficult to learn, we arrive, according to Flege's hypothesis, at a set of theories according to which one is perfectly well able to learn completely new sounds to perfection throughout one's life, whereas sounds in the new language that resemble and have many shared features with sounds in the native language are extremely difficult to acquire after the age of 5-6. These sounds are made to fit the native language categorisation.

It is precisely these native-language-based sound adaptations we register as an accent. The greater the overlap that exists between the sounds of the two languages, the more difficult it is to tune one's pronunciation completely to the sounds of the new language. This has been investigated for both vowels and consonants.

Some investigations also show that the position of a sound is by no means irrelevant (Eckman 1977, 1985). German speakers, who do not distinguish between voiced and unvoiced final consonants (e.g. /b/ and /d/ as both voiced and unvoiced) have trouble in acquiring this distinction in final position in English, whereas they have no trouble in making this distinction initially and medially as this is a feature of German. For Koreans, who do not have this voicing contrast in initial, medial or final position in their native language, the prediction is that it will be hardest for them to acquire the contrast between voiced and unvoiced consonant finally, then medially, and, least difficult, initially. A hypothesis for the Danes' struggle with the voiced stops in English would be that we find it more difficult to acquire the voiced final stop in English than the voiced initial stop in German and English.

Why is pronunciation, of all things, affected so early?

A final question to muse over is why pronunciation, of all things, it so difficult to acquire. One possible answer could perhaps be sought in what it is all about - the phonetic system.

If we have a sixth sense, it must be one of phonetic perception, as the brain researcher Anders Gade says. Phonemes are not separated by pauses when we hear them, and if our conversation partner speaks rapidly, we pick up 15 different phonemes a second. They are packed into a continuous stream of sounds, which we unpack and decode (Gade 1997:264). In terms of production, it calls for incredibly precise articulation work, not only for an individual organ but one that consists of a combination of articulatory movements carried out more or less simultaneously, where a selection is made among the approximately 100 cooperating muscles that make up the speech apparatus. This calls for motor control that is unrivalled in any other form of movement. With 15 phonemes a second, we are down to under 100 milliseconds a phoneme!

Sound reception and production thus require supremely efficient cognitive processes - in the case of reception, the hearer is engaged in both decoding and guessing; in production, the speaker is engaged in anticipatory planning.

Finally, pronunciation is the only aspect of language that calls for a close interaction between the cognitive and physiological processes. In acquiring new sounds we are also dealing with a complex re-organising of the articulatory processes.

Summing up

We can state that age is not a matter of discussion in the research conducted so far as regards the acquisition of pronunciation. If one begins to learn a new language later than 5-6, one will seldom attain a near-native pronunciation of the foreign or second language.

The explanations for this are legion; those best-tested are neurobiologically based, where among other things the myelinisation process and the speed of the nerve impulses in the brain are considered to be of vital importance for the capacity to learn. The complex articulatory process that is part of pronunciation also helps to explain why pronunciation is that aspect of language which is particularly exposed to the influence of age.

Research also agrees that the native language plays a central role in precisely the acquisition of pronunciation in a new language. But whereas the prevalent view was that it was the new sounds in the target language that were the most difficult or impossible to acquire, new research would seem to indicate that it is in particular the sounds that are close to the native language that are the most difficult to acquire, both because the native language resembles a filter through which one hears the sounds of the new language and because the complex articulatory patterns in the

native language predominate and are hard to modify. On the other hand, it is possible - according to these theories - to learn new sounds throughout one's life. If sounds are not classified on the basis of the sound rules of the native language, there is in fact the basis for the construction of new phonetic categories.

This may also provide an answer as to why so few Danes learn such close languages as Norwegian and Swedish faultlessly - and why most of us retain throughout our lives traces of our regional variant of the Danish language.

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